CLAIMS

We claim:

1. In a mobile communication device, a method for compensating for a frequency adjustment in an oscillator shared between a communication circuit and a positioning signal receiver, comprising:

at a first point in time, beginning receiving into a positioning signal received from the positioning signal receiver;

at a second time point, adjusting a frequency of the oscillator;

recording a frequency adjustment of the oscillator;

at a third time point, completing receiving the positioning signal into the positioning signal receiver; and

processing the positioning signal, taking into consideration the frequency adjustment.

2. A method as in Claim 1, wherein the recording comprises recording the second time point as the time at which the frequency adjustment of the oscillator is made.

3. A method as in Claim 2, wherein the processing hypothesizes a frequency shift in the received positioning signal between the second time and the third time.

4. A method as in Claim 1, wherein the recording comprises recording an amount by which the frequency of the oscillator is adjusted.

5. A method as in Claim 4, wherein the processing hypothesizes a time point at which the frequency adjustment of the oscillator is made.

6. A method as in Claim 1, wherein the processing comprises integrating a correlation function.

7. A method as in Claim 6, wherein the processing comprises searching for a code phase for which the correlation function has a significant value.

8. A method as in Claim 6, wherein the processing comprises searching for a Doppler frequency at which the correlation function has a significant value.

9 A method as in Claim 1, further comprising retrieving aiding data for processing the positioning signal.

10. A method as in Claim 1, wherein the positioning signal comprises a signal from a global positioning system (GPS) satellite.

11. A method as in Claim 1, wherein the communication circuit initiates the frequency adjustment of the oscillator.

12. A method as in Claim 11, wherein the communication circuit comprises a receiver and transmitter for cellular telephone communication.

13. A method as in Claim 12, wherein the frequency adjustment of the oscillator adjusts the offset from a nominal frequency in a communication signal transmitted from a base station.

14. In a communication device, a method for determining an operating frequency of an oscillator based on a reference signal from a reliable time base, comprising:

detecting a beginning time point of the reference signal received by the communication device;

upon detection of the beginning time point of the reference signal, enabling a counter to count in accordance with a clock signal derived from the oscillator;

detecting an ending time point of the reference signal received by the communication device;

upon detecting the ending time point of the reference signal, disabling the counter to stop the counter from further counting; and

determining the frequency of the oscillator based on the count in the counter and an expected time that elapsed between the beginning time point and the ending time point.

15. A method as in Claim 14, wherein the beginning time point and the ending time point represent a known duration in time.

16. A method as in Claim 14, wherein the beginning time point and the ending time point represent arrivals of recurring events in the reference signal, the recurring events recurs at a fixed frequency.

17. A method as in Claim 14, further comprising adjusting for processing times in the communication device for detecting the beginning time point and the ending time point.

18. A method as in Claim 1, wherein the recording comprises recording an indication that a frequency adjustment of the oscillator is made.

19. A method as in Claim 18, wherein the processing hypothesizes a frequency shift and time point of the frequency shift in the received positioning signal between the second time point and the third time point.

20. A method as in Claim 14, wherein the frequency of the oscillator thus determined is provided to a positioning signal receiver.

21. A method as in Claim 20, wherein the positioning signal receiver receives global positioning system (GPS) signals.

22. A mobile communication device, comprising:

a communication circuit;

a positioning signal receiver;

an oscillator shared between a communication circuit and a positioning signal receiver providing a frequency that is adjustable from the communication circuit; and

a central processing unit, wherein the central processing unit records a frequency adjustment of the oscillator, and processes the positioning signal, taking into consideration the frequency adjustment.

23. A mobile communication device as in Claim 22, wherein the central processing unit records the time point at which the frequency adjustment of the oscillator is made.

24. A mobile communication device as in Claim 23, the central processing unit hypothesizes a frequency shift in a portion of the received positioning signal received into the positioning signal receiver after the frequency adjustment.

25. A mobile communication device as in Claim 22, wherein the central processing unit records an amount by which the frequency of the oscillator is adjusted.

26. A mobile communication device as in Claim 22, wherein the central processing units hypothesizes a time point at which the frequency adjustment of the oscillator is made.

27. A mobile communication device as in Claim 22, wherein the central processing unit integrates a correlation function.

28. A mobile communication device as in Claim 27, wherein the central processing unit searches for a code phase for which the correlation function has a significant value.

29. A mobile communication device as in Claim 27, wherein the central processing unit searches for a Doppler frequency at which the correlation function has a significant value.

30 A mobile communication device as in Claim 27, wherein the central processing unit retrieves aiding data for processing the positioning signal.

31. A mobile communication device as in Claim 22, wherein the positioning signal comprises a signal from a global positioning system (GPS) satellite.

32. A mobile communication device as in Claim 22, wherein the communication circuit comprises a receiver and transmitter for cellular telephone communication.

33. A mobile communication device as in Claim 22, wherein the frequency adjustment of the oscillator adjusts the offset from a nominal frequency in a communication signal transmitted from a base station and received by the communication circuit.

34. An oscillator frequency determining apparatus in a communication device, comprising:

an oscillator providing a periodic output signal;

a receiver receiving a reference signal from a reliable time base;

a detector detecting a beginning time point and an ending time point of the reference signal received by the communication device;

a counter that begins counting the number of periods in the output signal of the oscillator in response to the detector detecting the beginning time point and

stops counter in response to the detector detecting the ending time point of the reference signal; and

arithmetic unit for determining the frequency of the oscillator based on the count in the counter and an expected time that elapsed between the beginning time point and the ending time point.

35. An apparatus as in Claim 34, wherein the beginning time point and the ending time point represent a known duration in time.

36. An apparatus as in Claim 34, wherein the beginning time point and the ending time point represent arrivals of recurring events in the reference signal, the recurring events recurs at a fixed frequency.

37. An apparatus as in Claim 34, wherein the arithmetic unit further adjusts for processing times in the communication device for detecting the beginning time point and the ending time point.

38. A mobile communication device as in Claim 22, wherein the central processing unit records an indication that a frequency adjustment of the oscillator is made.

39. A mobile communication device as in Claim 38, wherein the central processing unit hypothesizes a frequency shift and time point of the frequency shift in the received positioning signal between the second time point and the third time point.

40. An apparatus as in Claim 34, wherein the frequency of the oscillator thus determined is provided to a positioning signal receiver.

41. An apparatus as in Claim 40, wherein the positioning signal receiver receives global positioning system (GPS) signals.